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**Institutional Foundation of  
Economically Inefficient  
Agricultural Policy within the EU-  
System:  
A Neoclassical Approach**

Christian C.H.A. Henning

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ADDRESS

Chair of Agricultural Policy  
University Kiel  
Olshausenstrasse 40  
D-24118 Kiel

Phone: +49/431/880 444

Fax: +49/431/880 1397

E-mail: [uswarz@agric-econ.uni-kiel.de](mailto:uswarz@agric-econ.uni-kiel.de)

<http://www.uni-kiel.de/agrarpol/>

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Department of Agricultural Policy, University Kiel.  
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Bezug: Chair of Agricultural Policy, University Kiel, Olshausenstrasse 40, D-24118 Kiel, Phone: +49/431/880 444, Fax: +49/431/880 1397, E-mail: [uschwarz@agric-econ.uni-kiel.de](mailto:uschwarz@agric-econ.uni-kiel.de), <http://www.uni-kiel.de/agrarpol>

#### Zu dem Autor:

Professor Christian Henning ist Professor für Agrarpolitik an der Christian-Albrechts-Universität zu Kiel. Davor hat er an der Universität Mannheim, der Stanford University und dem Mannheimer Zentrum für Europäische Sozialforschung gelehrt und geforscht. Darüber hinaus war er als Berater für die FAO, die Europäische Union und andere internationale und nationale Organisationen tätig.

#### About the author:

Prof. Christian Henning has the professorship of the Chair of Agricultural Policy at the Department of Agricultural Economy at University Kiel. Before he joined the faculty in Kiel he did researches at the University Mannheim, Stanford University and at the "Mannheimer Zentrum für Europäische Sozialforschung". Hence he operated as consultant for the FAO, the European Union and further international and national organizations.

# **Institutional Foundation of Economically Inefficient Agricultural Policy within the EU-System: A Neoclassical Approach**

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by

Christian H.C.A. Henning

University of Kiel

The paper offers a rational explanation for the notorious inefficient farm support policies within the EU with an optimization model of legislative behavior and legislative institutions. It is argued that inefficient agricultural policies can be rationally explained if it is assumed that legislative decision making is determined by informal norms derived in the shadow of formal institutional rules. First, maximization of political support implies that different institutional actors, i.e. national members of the Council, Commissioners and relevant actors of the European Parliament, do prefer different levels of subsidization for the different national farm sectors. Second, according to the applied specific decision norm legislators' preferred policy positions are aggregated to a specific Common Agricultural Policy. In the formal model informal norms correspond to a specific organization of political exchange, where on a macro level legislators change political rights to control policies in specific policy domains, and on a micro level within a policy domain network political control rights are changed over specific policy dimensions. Beside the importance of the "principle of ministry government", that is political control rights over agricultural policies are generally obtained by actors that are politically strongly related to the farm sector, the model emphasizes the impact (1) of external effects of political exchange and (2) of the principle of financial solidarity on the efficiency of CAP. Since the foundation of the EU norms have been changed from less efficient norms, i.e. the Luxembourg Compromise corresponding to Weingast's norm of a universal coalition, to more efficient norms reflecting qualified majority voting within the Council. Observed changes of norms are interpreted as legislators choosing the rules of the game maximizing their expected benefits, where the enlargement of the EU is identified as a main factor forcing legislators uniquely to choose new norms.

Keywords: Formal model of legislative decision-making, political exchange, external effects, political economy of CAP

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## 1 Introduction

It is a common observation in so-called industrialized countries that declining industries, in particular agriculture, are heavily protected or supported in an inefficient manner at the expense of the general public. While governmental intervention in declining sectors is generally supported by a majority of the society and hence can be interpreted as a public good, it is mainly the specific amount or way of provision of this public good that is criticized in the literature (Weingast et al. 1981, Lohmann 1998, especially for agriculture see Koester/Tangermann 1977, v. Witzke 1986).

Explaining inefficient public policies as the outcome of individual rational behavior the political economy focuses on specific characteristics of the political process. For example, Olson (1965) as well as Becker (1983) emphasize the high lobbying potential of small homogenous economic interests of the declining sector when compared to the low lobbying potential of the heterogeneous general public due to the free-rider problem inherent in organizing collective political action. A related argument can be found in Wilson's (1989) client politics as well as Baron (1994) and Grossman/Helpman (1994). What is left unexplained in these lobbying stories is (a) the fact that at least in democracies politicians are elected by the general public and hence inefficient policies should be excluded from the political agenda through the dynamics of the electoral competition (see Arnold 1990, Lohmann 1998). (b) even assuming asymmetric lobbying activities cannot explain the observed selection of economically inefficient policy instruments to redistribute income from the general public to well-organized special interest groups (Lohmann 1998, Dixit/Londregan 1995). Starting from this criticism another line in the political economy literature focuses on information asymmetries between voters and politicians (Downs 1957; Coate and Morris 1994, Lohmann 1998). In particular, the paper of Lohmann offers a very sophisticated informational rationale for the fact that political competition among an incumbent and her challenger leads to inefficient public policies due to information asymmetries among different voter groups. Other authors have considered the issue of time inconsistency in the context of policy-making. For example, Dixit and Londregan (1995) explain economically inefficient redistributive

policies focusing on the problem that the political process cannot make credible long-term commitment.

Certainly all of the approaches mentioned above contribute to the explanation and understanding of observed inefficient agricultural policies, nevertheless all of them left out the specific legislative organization under which political decision-making takes place. In particular, they explain why specific politicians competing for the same voter or clientele do adopt inefficient policies. But, what they do not explain is how multiple agents serving different political clienteles, e.g. being elected in different constituencies, and thus having different preferences for specific public or redistributive policies collectively agree on inefficient policies. This feature, e.g. the geographical distribution of cost and benefits of agricultural policies, seems especially important in the framework of Common European Agricultural Policy, as a specific agricultural policy translates into a specific redistribution of net-welfare over national member states, and national political agents collectively selecting these policies only receive political support from their own member states.

Explaining inefficient public policies by specific characteristics of legislative organization goes back to the pioneering work of Weingast on a theory of congressional norms (1979 and Weingast et al. 1981). Our model can be understood as an extension of Weingast's theory of congressional norms to explain the observed inefficiency of the Common European Agricultural Policy. While in Weingast's original model informal norms solely correspond to the formation of an universal coalition, i.e. only apply to simple committee decision, in our model informal norms correspond more generally to a specific organization of political exchange allowing for a more complex organization of legislature including multi-chamber systems as observed for the EU. In detail, on a macro level legislators change political rights to control policies in specific policy domains, and on a micro level within a policy domain network political control rights are changed over specific policy issues. The model emphasizes three aspects of the organization of legislative decision-making: (1) the importance of geographical distribution of gains and losses from specific national agricultural policies, (2) the principle of ministry government, that is political control rights over agricultural policies are generally obtained by actors that are politically strongly related to the farm sector and (3) external effects of political exchange,

which result due to the similarity of preferred political positions of national governments regarding interventions in other than their own national agricultural sector. Observed legislative organization is interpreted as an institutional choice equilibrium, i.e. legislators choose the rules of the game maximizing their expected benefits.

The paper is organized as follows. In section 2 we derive our theoretical model. In section 3 we apply our political exchange model to present agricultural policy decision-making within the EU. In particular, we identify informal and formal organizational structures of legislature provoking inefficiency. In section 4 the economic efficiency of alternative options of legislative organization are analyzed. Section 5 summarized the main results and discussed aspects of future research, especially how received results might be use analyzing problems of constitutional choice within the European integration process.

## 2 The Model

Following Baron and Ferejohn (1989) we consider a legislature comprising  $n$  legislators  $N=\{1,\dots,n\}$  and constitutionally fixed majority voting rule  $\varphi$ . The legislature has collectively to choose an alternative  $\alpha$  out of a compact and convex subset  $R^m$  of the  $m$ -dimensional cube  $(0,1)^m$ . Each legislator  $i \in N$  has a complete, transitive binary preference relation,  $>_i$ , defined for all  $\alpha, \alpha' \in R^m$ , that is represented by an ordinal and concave utility function  $U^i(\alpha)$ .

Formally, the rule  $\varphi$  corresponds to a binary choice procedure  $C(\alpha, \alpha')$  which determines that legislature chooses among two alternatives  $\alpha$  and  $\alpha'$  and a random recognition rule that determines which legislator can make a proposal. The choice procedure  $C(\alpha, \alpha')$  can be represented by a set  $G$  of winning coalitions. A winning coalition  $g \in G$  is defined as an element of the superset  $2^N$ , for which the following holds: if all members of  $g$  prefer an alternative  $\alpha$  in comparison to an alternative  $\alpha'$ , then the legislature prefers the alternative  $\alpha$  to  $\alpha'$ .

If  $s$  denotes the status-quo policy, a necessary condition for a change of the status-quo policy is the existence of a winning coalition  $g$  whose members uniquely prefer an alternative  $\alpha$  to the status quo  $s$ . Let  $W(s) \subset R^m$  denote the subset of alternatives  $\alpha$ ,

for which a winning coalition exists that prefers  $\alpha$  to  $s$ . A general characteristic of legislative decision-making is that  $W(s)$  is generally a large subset of  $R^n$  and there exists a large number of different winning coalitions preferring different alternatives to the status quo. Moreover, constitutional rules do neither determine which winning coalition has to form nor which element of  $W(s)$  has to be proposed.

In this context Baron (1995) as well as Banks and Duggan (1998) assume that the final selection of an alternative  $\alpha \in W(s)$  is a non-cooperative bargaining procedure among legislators determined by the following rules. At a first stage an individual legislator  $i \in N$  is selected by a randomized recognition rule to propose a specific alternative, and at a second stage the selected legislator has to form a stable winning coalition for his proposal. If a selected legislator succeeds in forming a winning coalition for his proposal, this proposal is the new policy, if not a new legislator is selected and the procedure starts from the beginning.

Assuming individual preferences are common knowledge, Banks and Duggan (1998) have shown that the non-cooperative bargaining game has a stationary solution even for multidimensional policies and multiple legislators, i.e.  $m, n > 1$ .

Moreover, Baron (1995) pointed out that in contrast to classical political exchange theory (see for example Buchan/Tullock 1967, Weingast/Marshall 1988) sequential choice theory does no more have the instability problem of social choice theory and in contrast to political exchange theory does not require mechanisms to enforce trades. Nevertheless, although Baron claims that sequential choice theory does not assume away the fundamental problems of political exchange theory, it is a matter of fact that the nice property of sequential equilibrium crucially depends on the assumption that individual policy preferences are common knowledge. This assumption seems hardly realistic. In contrast, many scholars of legislative decision-making assume that individual policy preferences are private information. For example, Blin and Satterthwaite (1977: 881) underline "[T]herefore, a realistic analysis of voting behavior must accept that a member's true preferences are private", and Wilson (1967) even stronger concludes that most of the legislative institutions would be superfluous if individual policy preferences were common knowledge.



Assuming policy preferences are private information implies that individual legislators have to form specific beliefs regarding the policy preferences of other legislators. Introducing these assumptions it can be shown that from legislators' perspective sequential equilibrium in general becomes inefficient (see for example Blin and Satterthwaite 1977).

In this context we assume a rather simple process of the formation of individual beliefs regarding other legislators' preferences. In detail, we assume that each legislator  $i \in N$  suggesting a proposal assumes that any other legislator  $j \in N$  has only a specific probability  $P_{ij}$  to join a winning coalition supporting his proposal. The exact probability  $P_{ij}$  is not known by a legislator  $i$ . Instead he only knows a distribution  $p^{ij}$  of this probability. Of course, the distribution  $p^{ij}$  generally depends on the proposal  $x_i$  made by a legislator  $i$ . In this regard, we make the following simplifying assumptions. Legislators commonly know a set  $H(s)$  that includes the win set  $W(s)$ , i.e. it holds:  $W(s) \subseteq H(s)$ . For any point not in  $H(s)$  it holds:  $P_{ij}(\alpha) = 0$  for all legislators  $i, j \in N$ , where legislators can generally not distinguish between different proposals  $\alpha \in H(s)$ . That is the probability distribution  $p^{ij}$  is the same for all elements  $\alpha \in H(s)$  and for all legislators  $j \in N$ . In more specific terms we assume for any pair of legislators that this distribution is uniform over the  $[0,1]$ -interval<sup>1</sup> for all  $\alpha \in H(s)$ <sup>2</sup>.

It is beyond the scope of this paper to derive the assumed probability distributions analytically from a specific modeling of belief formation. Note in this context that the assumptions made above correspond with a specific elaboration of the fact that legislators' policy preferences are private information. Generally assuming this kind of private information implies that the process of forming a winning coalition for a given proposal is ex ante uncertain for an individual legislator. The following expositions rest on especially this implication of private information and will therefore not change in substance when a different and more sophisticated modeling strategy will be

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<sup>1</sup> Of course, given any specific proposal the probability  $P_{ij}$  depends on the policy preferences of legislator  $j$ . But to take strategic advantage of this general property a legislator has to know these preferences.

<sup>2</sup> Assuming legislators can be positioned at least in an ideological space would imply that ideal positions of legislators are correlated according to their ideology. Hence, ideology would allow legislators to form individually specific probabilities for each legislator. Note, that the assumption of individual probabilities  $P_{ij}$  due to the common knowledge of legislators' ideological positions would not change substantially the results derived in the following.

applied. These simplifying assumptions have two advantages: (1) The outline of argumentation is simplified, and (2) it facilitates empirical application. Finally, we assume that in general the time to draw a legislative decision is limited. This implies that legislature will not infinitely consider proposals regarding a specific decision. Thus, ex post the number of proposals that have been made is always limited, while the number of proposals that will be considered is ex ante not known by individual legislators. Therefore, it is assumed that after each round there exists a fix probability  $p_T$  that a next round will occur. Thus, after each round the legislative decision procedure stops with a probability  $(1-p_T)$  and the status quo policy sustains. We assume that the organization of legislature, including the voting rule  $\varphi$  and the random recognition rule, the set  $H(s)$ , the probability  $p_T$  and the individual probability distribution  $p^j$  are common knowledge to all legislators.

Under these assumptions the legislative process can be understood as a non-cooperative game of winning coalition formation corresponding to the game tree given in figure 1 below.

- figure 1 -

Given the infinite form of the game we cannot directly derive subgame-perfect Nash equilibrium using backwards induction. Instead following Baron and Ferejohn (1989) we could analyze stationary equilibria. As is shown in Proposition 1 it follows directly from the simple structure of the game that a stationary subgame-perfect equilibrium of our legislative bargaining game is defined by the following pure strategy configuration: a recognized legislator proposes the maximand of the utility function  $U_i(\alpha)$  over  $H(s)$ . Let  $x_i$  denote this maximand. Obviously, as long as  $x_i$  is unique for each legislator, the stationary subgame perfect Nash equilibrium is unique.

As is shown in proposition 1 we further can characterize the stationary subgame-perfect equilibrium of the winning coalition game in the following way. There exist fixed ex ante probabilities  $Q_s$  and  $Q_i$ , respectively, that the status quo and the individual proposals  $x_i$  will be the outcome of the legislative decision. Hence, the ex ante outcome of the legislative bargaining game is a lottery over legislators' proposal

$x_i$  and the status quo  $s$ , where  $Q_s$  is the probability of the status quo and  $(1-Q_s) C_i$  is the probability of the proposal  $x_i$ .  $C_i$  corresponds to the relative probability that the proposal of legislator  $i$  will be the final outcome and is completely determined by constitutional voting rule  $\phi$ .

Accordingly, assuming for simplicity that the discount factor is 1 for all legislators the value ( $v_i$ ) of the legislative bargaining game is given for a legislator  $i$  by:

$$(1) \quad v_i = (1 - Q_s) \sum_k C_k U_i(x_k) + Q_s U_i(s).$$

*Proposition 1:* Assuming for all legislators a discount factor  $\delta=1$  a configuration of pure strategies is a stationary subgame-perfect Nash equilibrium of the infinite session legislative game if and only if it fulfills the following condition: (i) a recognized legislator proposed  $x_i$ , the maximand of his utility function over  $H(s)$ . (ii) The ex ante probability  $Q_i$  that the proposal  $x_i$  will be the final outcome of the legislative game is given by

$$(2) \quad Q_i = (1 - Q_s) \frac{g_i}{\sum_k g_k},$$

where  $Q_s$  denotes the ex ante probability that the status quo will be the final outcome of the legislative decision and  $g$  denotes for every  $i \in N$  the number of winning coalitions, in which  $i$  is a member. (iii) In particular, it holds for  $Q_s$ :

$$(3) \quad Q_s = \frac{(1 - p_T) \left( 1 - \frac{0.5^n}{n} \sum_k g_k \right)}{1 - p_T + p_T \frac{0.5^n}{n} \sum_k g_k}$$

(iv) The ex ante values of the game  $v_i$  are determined by:

$$(4) \quad v_i = (1 - Q_s) \sum_k Q_k U_i(x_k) + Q_s U_i(s)$$

*The proof of proposition 1 is given in the appendix.*

Thus, according to proposition 1 the outcome of the non-cooperative bargaining game is a lottery over the status quo and the ideal points of the legislators. Accordingly, the value of the game corresponds for each legislator with the expected utility over this lottery. Obviously, uncertainty of the outcome implies inefficiency,

that is there always exists at least one common proposal  $x$  that ex ante will be preferred by all legislators vis-à-vis the expected outcome of the legislative game, i.e. it holds:  $\exists x \in H(s) : U_i(x) \geq v_i \quad \forall i \in N$ . Moreover, it will be shown in the following mean voter theorem that there exists at least one universalism legislative game (ULG) including a common proposal procedure that leads for every individual legislator to a higher value of the game when compared to the non-cooperative legislative game described in proposal 1 and thus dominates the non-cooperative legislative game (NLG).

*Definition:* Define the following universalism legislative game (ULG): The legislative decision is drawn according to the following three-step procedure. First, a leader of the legislature  $L \in N$  is appointed by a random recognition rule. At a second stage every legislator  $i \in N$  submits a proposal  $x_i$  to the leader. At the third stage the leader chooses the final policy  $x^M$  according to the following mean voter decision rule:

$$(5) \quad x^M = (1 - Q_s) \left( \sum_{i, x_i \in H(s)} C_i x_i + x_L \sum_{i, x_i \notin H(s)} C_i \right) + Q_s s.$$

*Mean Voter Theorem:* Assuming legislators' preferences can be represented by an ordinal and concave utility function  $U_i(\alpha)$  and denoting by  $v_i^{NLG}$  and  $v_i^{ULG}$  the individual value of the universalism and the non-cooperative legislative game then it holds:  $v_i^{ULG} \geq v_i^{NLG} \quad \forall i \in N$ . That is ULG dominates NLG for all legislators (e.g. leads ex ante to a higher expected utility).

*Proof:* Obviously, under given assumptions the unique solution of ULG is the following configuration of pure strategies: (i) every legislator suggests the maximand ( $x_i$ ) of his utility function over  $H(s)$ , (ii) the selected leader chooses  $x^M$  according to the mean voter decision rule. Therefore, for any legislator  $i$  the value of the game results in  $U_i(x^M)$ . Given the definition of  $x^M$  it follows directly from the concavity of  $U_i$  that it holds:

$$(6) \quad U_i(x^M) = U_i \left( \sum_{k \in N} C_k ((1 - Q_s)x_k - Q_s s) \right) \geq \sum_k C_k (1 - Q_s) U_i(x_k) + Q_s U_i(s) = v_i$$

Q.E.D.

Further, applying the mean voter decision rule in an ULG and assuming heterogeneous policy preferences generates gains from exchange among legislators (Weingast/Marshall 1988). In the context of ULG political exchange corresponds to the desire of individual legislators to increase their individual weight ( $c_i$ ) for dimensions  $j \in M$  they are highly interested in, in exchange for a lower weight for policy dimensions they are less interested in. Therefore, the weight of a legislator  $i$  for a policy dimension  $j$  can be interpreted as his political control resources  $c_{ij}$  over this dimension. Formally, substituting the mean voter  $x^M$  into legislators' utility function results in a utility function  $V_i(c)$  over political control resources. Denoting the original distribution of individual political control resources by the vector  $c^a = \{c^1, \dots, c^j, \dots, c^m\}$ , where  $c^j = C_1, \dots, C_n$  for all  $j \in M$ , gains of exchange exist if there exists another feasible distribution of political control resources  $c^*$  for which it holds:  $V_i(c_i, c_{-i}) \leq V_i(c_i^*, c_{-i}^*) \quad \forall i \in N$ . Obviously,  $c^* = \{c^{1*}, \dots, c^{j*}, \dots, c^{m*}\}$ , is a feasible distribution of control resources if it holds for all  $j$ :  $\sum_{i \in N} C_{ij} = 1$ .

Moreover, applying the mean voter decision rule political exchange results in the following final policy outcome  $x^{EM}$ :

$$(7) \quad x^{EM} = \{x_j^{EM}\}, \quad x_j^{EM} = \sum_{i \in N} [C_{ij}^* (X_{ij} (1 - Q_s) + Q_s S)].$$

Obviously, as long as gains of exchange exist the ex ante value of a legislative exchange game (ELG) is for every individual legislator higher than for the ULG. Nevertheless, the core problem of the ELG is the organization of political exchange. As will be discussed in more detail in the following section, political exchange in contrast to economic exchange is plagued by high transaction costs mainly due to the enforcement problem of trades. Thus, the problem is to identify a specific organization of political exchange that beyond a market organization deals with these specific problems and allows political exchange given reasonable transaction costs.

### *On the organization of political exchange*

The main problem of political exchange is to find a specific organization of exchange that guarantees to yield a distribution  $c^*$ . The classical political exchange models

simply assume that political exchange is organized in markets analogously to the exchange of economic goods (Tullock 1970, Wilson 1969, Coleman 1966). The classical approach of political exchange has been heavily criticized by scholars of industrial organizations and political sociology to neglect transaction costs of political exchange (Weingast and Marshall 1988, Kappelhoff 1993). For example, Weingast and Marshall (1988: 138) argue “..this approach assumes away some of the deepest problems plaguing legislative exchange.” That is a market organization of political exchange as a social in contrast to an economic exchange of goods is plagued by high transaction costs due to the problem of enforcement of trades, i.e. problems of opportunism, moral hazard and measurement (Weingast and Marshall 1988). To put it in different words, key institutions of a market economy like money and contract law are lacking in the framework of political exchange (Henning 2000). Weingast and Marshall conclude that in a market organization of political exchange the only non-institutional enforcement of cooperation is reputation resulting from repeated interaction which in their opinion is insufficient to prevent problems of opportunistic behavior (Weingast/Marshall 1988: 139). Moreover, Weingast and Marshall parallel the enforcement problems of legislative exchange with the problem of vertical integration and following the literature of the new economics of organization suggest a non-market organization of political exchange. In particular they suggest that a committee system is a sufficient organization that allows institutionalized trades among legislators: “Instead of trading votes, legislators in the committee system institutionalize an exchange of influence over relevant rights. Instead of bidding for votes, legislators bid for seats on committees associated with rights to policy areas valuable for their reelection. In contrast to policy choice under a market for votes, legislative bargains institutionalized through the committee system are significantly less plagued by problems of ex post enforceability.” (Weingast and Marshall 1988).

Although the approach of Weingast and Marshall certainly improved the classical political exchange models in important aspects, it nevertheless contains some systematic shortcomings in other aspects. First, as long as the policy domain contains more than one policy dimension, there still remains a serious collective decision-making problem within a committee. In this regard the theory of Weingast

and Marshall does not provide any further insights<sup>3</sup>. Second, Weingast and Marshall neglect external effects of exchange. For example, beyond the relative interest of a legislator in a specific policy domain and beyond the expected number of other bidders, a support seeking legislator might not bid for a specific committee seat, because existing (or expected) members of a committee have an ideal position that is very close to his own ideal position. The neglect of external effects by political exchange approaches has already been criticized by Riker and Brams (1973) as well as Schwarz (1975) pointing out that not incorporated external effects might lead to pareto-inferior outcomes of political exchange.

Therefore, to overcome the criticism on the approach of Weingast and Marshall we suggest alternatively a specific organization of political exchange as mixed form of centralized exchange and firm-like industrial organization.

#### *Centralized political exchange as an abstract economy*

In the following section we derive a model of political exchange including external effects in sequential steps. First we introduce a central exchange (auction) mechanism, that allows to define an exchange equilibrium taking into account external effects. Next we justify the assumption explicitly made to guarantee the existence of the exchange equilibrium. In particular, we will identify formal and informal institutions that overcome the enforcement problems inherent in market organization of political exchange.

Consider a ULG as defined above. Given the individual policy preferences and the mean voter decision rule, one can define individual preferences  $V_i(c)$  over political control resources:

$$(8) \quad V_i(c) = U_i(\mathbf{a}), \text{ with } : \mathbf{a} = \sum_k C_k \tilde{x}_k \text{ and } \tilde{x}_k = (1 - Q_s)x_k + Q_s s$$

Further, we introduced the following central political exchange mechanism:

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<sup>3</sup> Implicitly, Weingast and Marshall seem to assume that a policy domain contains only a single policy dimension. Under this assumption their model results directly in the final policy decision.

- a. the leader L determines prices  $p = p_1, \dots, p_j, \dots, p_m$  for the policy dimension  $j = 1, \dots, m$
- b. each individual legislator can demand political control resources  $c^{i*}$  and supplies his control endowment  $c^{ia}$ , where the value of demanded control resources cannot exceed the value of supplied control resources:  $c^{i*} p \leq c^{ia} p$ .

Intuitively, given the prices of political control resources each individual legislator wants to allocate his given political control resources over the different policy dimension in such a manner that his utility is maximized. Hence, analogously to classical demand theory each legislator chooses a control vector  $c^{i*}$  that maximizes his individual utility given the prices  $p$  and his individual control endowment  $c^{ia}$ . But, in contrast to standard demand theory we observe external effects of consumption, i.e. according to the mean voter decision rule the individual utility of a legislator  $i$  and therefore the choice of  $c^{i*}$  depends also on the choices  $c^{-i*} = \{c^{1*}, \dots, c^{i-1*}, c^{i+1*}, \dots, c^{n*}\}$  of other legislators  $k \neq i$ . Intuitively, the higher the demand of control resources of other legislators for a specific policy dimension  $j$ , which have ideal points  $(x_{kj})$  that are similar ideal point of legislator  $i$  ( $x_{ij}$ ), the lower c.p. will be the demand of control resources of legislator  $i$  for this policy dimension  $j$ .

Obviously, the individual demand of a legislator  $i$  depends on the behavior of other legislators as well as on the prices  $p$ , that is on the behavior of the leader. To define an exchange equilibrium for this central exchange mechanism we first introduce the following definitions (see also Ellickson 1993):

Define the strict preference mapping  $P(c, p)$  :

$$(9) \quad P_i : C \rightarrow 2^{C_i}, c \rightarrow P_i(c) := \{c^{i'} \in C_i \mid c^{i'} \succ_i^{c^{-i}} c_i\}$$

where the set  $P^i(c)$  represents the set of all control vectors  $c^{i'}$  preferred to the control vector  $c^i$  by the legislator  $i$  when the environment is  $c^{-i}$ . Moreover,  $C_i = (0, 1)^m$  denotes the strategy set of legislator  $i$ , i.e. set of control vectors legislator  $i$  could theoretically demand, accordingly it holds:  $C = \prod_{i \in N} C_i$ .

Moreover, we define the following budget sets  $\beta_i(p)$ :

$$(10) \quad \mathbf{b}_i(p) := \{c^{i'} \in C_i \mid p c^{i'} \leq p c^{ia}\}$$



Accordingly, the best response of legislator  $i$ , i.e. the best choice she can make given the choices of other legislators and the prices  $p$ , is defined as:

$$(11) \quad B_i(c, p) := \{c^i \in C_i \mid P_i(c) \cap b_i(p) = \emptyset\}$$

Note that the best response correspondence in eq. (11) has essentially the same interpretation as the best response of consumers in a simple Walrasian economy. Therefore we will call  $B_i$  demand correspondence in the following.

Next we define the preferences and best response correspondence of the Leader  $L$ . Obviously, the main task of the leader  $L$  is to derive a political exchange equilibrium, that is to find a price vector  $p^*$  for which the best responses  $c_i^*$  of all legislators just clear the political market, that is fulfill the following condition:

$$(12) \quad \sum_i c^i - \sum_i c^{ia} = Z(c, c^a) \leq 0$$

Therefore, following Debreu's concept of an abstract economy we assume that the leader analogously to the Walras auctioneer maximize the value of the excess demand function  $V_L(c, p) = p^* Z(c, p)$ , then the best response correspondence  $B_L$  of the leader is defined as:

$$(13) \quad B_L(c, p) = \left\{ p' \in P \mid p' Z(c, c^a) = \sup_p V_L(c, p) \right\}$$

Definition: An  $n$ -tuple  $(c^*, p^*) = (c^{1*}, \dots, c^{i*}, \dots, c^{n*}, p^*)$  is called a political exchange equilibrium if it holds:  $c^{i*} \in B_i(c^*, p^*)$  and  $p^* \in B_L(c^*, p^*)$ .

Note that a political exchange equilibrium corresponds to an equilibrium of an abstract economy and hence extend the Nash equilibrium concept (see Ellickson 1993: 288).

Proposition 3: As long as it is assumed that

- The set  $C_i$  is nonempty, compact, and convex for all  $i \in N$ ,
- The demand correspondence  $B_i$  is nonempty-valued, convex-valued, and upperhemicontinuous (uhc) for all  $i \in N$ ,
- The leader's best response  $B_L$  is nonempty-valued, convex-valued, and uhc,
- $c^i \in \text{cl}B_i(c, p)$  for every  $(c, p)$  for which  $Z(c, c^a) \leq 0$ .

The political exchange mechanism corresponds with an abstract economy, and a political exchange equilibrium exists. Moreover, the political exchange equilibrium corresponds to a Walrasian exchange equilibrium including external effects.

The proof of proposition 3 is directly given in Ellickson (1993: 297pp) and therefore is omitted here. Note that it is sufficient to assume well-behaved (concave and continuous) individual utility functions to imply main assumptions made in proposition 3.

So far we have only defined a central political exchange mechanism including external effects of exchange and proved that for this mechanism a Walrasian equilibrium exists. The question is now to what extent it is conceivable that this mechanism describes decision-making in real legislatures. In particular the following questions remain: How is the exchange equilibrium reached? To what extent does the defined mechanism really overcome the commitment and enforcement problem inherent in political market exchange?

To answer the first question, assume that in our simple legislature the mean voter position is formulated in a political discussion organized by a committee leader. Formally, this discussion corresponds with the central exchange mechanism, that is the leader defines prices for the different policy dimensions and individual legislators announce their political control demand. In contrast to a commodity market, centralized political exchange allows for false trading or recontracting (see also Coleman 1973), that is in the political discussion legislatures only announce their individual control demands given the announced prices without executing their trades. Given the announced individual demands the leader checks if an equilibrium is reached, if not he announces new prices and the process starts again. This procedure is repeated until equilibrium is reached<sup>4</sup>. Thus, the political discussion including false trading defines a tatonement process.

To the second question, note that in contrast to classical political exchange models no enforcement problem arises as long as political exchange occurs only over different policy dimensions of the same multidimensional decision. Enforcement

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<sup>4</sup> To include external effects into individual demand decisions, the leader only has to announce the actual mean voter position corresponding to the actual control demand.

problems arise when decisions are made sequential in time and legislators want to exchange control over different policy decisions in time.

The central exchange mechanism described above can generally incorporate political control exchange in time. We just have to introduce intertemporal utility functions for the individual legislators and define the budget sets over two time periods, that is total demand of political control demand in both time periods has to equal total supply of control resources in both periods. The only problem that occurs is that for an individual legislator total demand will generally not equal total supply within one time period. Hence, in equilibrium some legislators shift political control resources from future to present decisions and vice versa some shift present control resources to future decisions. Thus, in equilibrium the latter legislators grant political credit to former. This implies the latter have to trust the former, that is they have to rely on their promises that they will be paid back their granted credits. Due to opportunistic behavior this kind of trust building would be problematic as long as dyadic trust relations are assumed. In contrast, one can assume that there exists a central credit and saving accounting system, i.e. the leader accounts for individual political credits and savings. Thus, no dyadic promises are made, but credits are granted and savings are guaranteed by the leader representing the complete legislature. In a way the central accounting system is comparable to money in a commodity economy, as money is a promise of the central bank representing the complete economy. Analogously political savings are guaranteed by the leader representing the complete legislature. Moreover, note that as long as a legislator remains in legislature in the future period, credits granted to this legislator can be directly enforced by the leader, thus there is no room for opportunistic behavior. Of course, enforcement problems arise when individual legislators might leave legislature in the future period. In this case enforcement problems can be avoided if individual legislators are organized in teams that are collectively reliable for credits taken by team members. Formally, the organization in teams corresponds to a partition of the set  $N$ . Even if some team members might leave legislature in the future period reputation effects of the total team guarantee that successors of leaving team members will repay taken credits. Examples for teams in the framework of national legislature are parties or in the framework of supranational legislature national delegations.

Finally, note that political control exchange might work, even if future decisions are unknown to legislators, as long as it is assumed that policy dimensions might be nested into specific macro-dimensions. An example for such macro-dimensions are different policy domains, like agriculture, foreign policy, security, etc. Moreover, a specific policy domain can be further subdivided into different subdomains, e.g. agriculture into milk, meat, cereals, etc. Given this definition of macro-dimension it is conceivable that political exchange takes place in a multistage procedure, e.g. first political macro-control is exchanged over policy domains and subdomains and at a later stage political control resources over policy dimensions are exchanged. Hence, assuming nested spatial policy preferences legislators might exchange political control resources of policy intervention in the cereal sector today with future control resources over policy intervention in the milk sector via an exchange of macro-control resources over corresponding subdomain. This kind of exchange is also conceivable even if at the time of exchange no concrete proposal and therefore no concrete milk dimensions exist.

Of course, centralized exchange implies transaction cost, i.e. the tatonnement process is time-consuming and legislators have to invest in information on various policy dimensions. Therefore, the possibility to organize centralized political exchange is limited on the one hand by the number of legislators, and on the other hand by the number of policy dimensions. Thus, for large legislatures deciding over a large set of different policy domains and dealing simultaneously with a large number of policy dimensions the following mixed organizational form combining a firm-like industrial organization over policy domains and a centralized political exchange within a policy domain will be more efficient.

To apply the idea of mixed organizational structure of legislature we introduce the following definitions of a committee system  $K = K_1, \dots, K_M$  and a system of policy domains  $P = P_1, \dots, P_P$  (see also Shepsle 1979):

*Definition 2:* Call a family of sets  $K = \{K_i\}$  a committee system if it covers  $N$ .

*Definition 3:* Let  $E = \{e_1, \dots, e_m\}$  be an orthogonal basis of  $\mathbb{R}^m$ , where  $e_i$  is the unit vector for the  $i^{\text{th}}$  dimension. Call the family of sets  $P = \{P_j\}$  a system of policy domains if it covers  $E$ .

Given the definition above a specific organization of a legislature comprises a committee system, a policy domain system and a mapping of a committee system into the policy domain system which defines which committees have jurisdiction over which policy domains. For a simple legislature it holds  $K = N$  and all legislators commonly decide on all policy decisions. In the case that  $K$  is not a trivial, e.g. there exists more than one committee and different committees have jurisdiction over different policy domains, a firm-like industrial organization of political exchange exists. Particularly, Weingast and Marshall assume that there exist  $P$  committees, where each of these committees is mapped into a specific policy domain over which it has monopoly political control. Therefore, the bidding mechanism whereby vacant seats in the different committees are assigned to legislators establish an exchange mechanism over rights to control specific policy domains. In the context here Weingast and Marshall approach can be interpreted as an exchange of political macro control resources  $G_j$  over policy domains  $J=1, \dots, P$ . If further at least one policy domain comprises more than one policy dimension we will speak of a mixed organizational form of political exchange, where exchange of macro-control resources over policy domains is institutionalized analogously to firm-like industrial organization and exchange of micro control resources within a policy domain is organized as centralized exchange in a committee. For notational convenience, we follow Henning (2000) and denote this kind of a mixed organizational form as a network organization of political exchange.

Finally, two more comments should be made. First, it is by no means claimed that a committee system is established only to serve an efficient organization of political exchange. In fact there might be other reasons a committee system is actually established for. For example, Gilligan and Krehbiel (1993) have criticized the political exchange approach of Weingast and Marshall by pointing out that the committee system of a legislature is not a specific organization to reveal gains from exchange, but much more a specific organization to reveal gains from the division of labor. We only claim that given a specific committee system political exchange is possible according to the mechanism described above.

Secondly, the legislature assumed in figure 1 above has a rather simple institutional structure, e.g. only one chamber is assumed. More complex institutional structures

arise including multiple chamber systems. In this case the constitutional choice rule becomes also more complex as in contrast to a one chamber legislature in multi-chamber legislature it has to be specified first under which constellations of voting of individual legislatures a proposal is accepted by a chamber and next under which constellation of chamber voting a proposal is accepted or rejected by the complete legislature. Nevertheless, even for a multi-chamber system any constitutional rule corresponds with a set of winning coalitions and hence a NLG and a ULG can be analogously defined. Therefore, the exposition made above can be directly generalized to multi-chamber systems.

### **3 The logic of agricultural political decision-making in the EU-system**

There is hardly any other policy that has been as much criticized as the Common European Agricultural Policy (CAP) (see v. Witzke 1989). In particular, the CAP is criticized as an extremely inefficient policy. Inefficiency of the CAP corresponds mainly to the fact that applied agricultural policies to support income of the agricultural producers have increasing negative side effects on the general public, i.e. increasing consumer expenditures for food, budget outlays and international trade conflicts. While inefficient protection of the agricultural sector is a common feature for most industrial countries (see Tyers/Anderson 1993), the specific puzzle of the CAP is that agricultural protection is significantly high for the EU when compared to other industrialized countries, e.g. the USA (Homan/Hayami 1986). Hence, obviously there exist some specific features of the EU-system that imply an extraordinarily high agricultural protection bias. The claim of the paper is that these specific features correspond to a specific institutional structure under which the CAP is formulated. As will be more elaborated in the following section, this specific institutional structure corresponds to the principle of financial solidarity, i.e. the common finance of the CAP and a specific organization of political exchange.

In essence, agricultural policy interventions in industrialized countries aim to support the income of agricultural producers. Given the supranational character of the EU-system CAP can be interpreted as the provision of a vector of national income support to the different national agricultural producers. Let  $\alpha_n$  denote the level of

income support in the member state  $n$ , then the CAP corresponds to the vector  $\alpha = \{\alpha_n\}$  of national agricultural support levels.

Therefore, explaining the extraordinarily high protection level of the CAP corresponds to explaining why national protection levels formulated under the CAP are higher in comparison to national protection levels derived under national policy.

At national level there is a wide range of political economy approaches explaining why agriculture is protected in industrial countries and protection levels are the higher the more advanced an industrialized country (see for example Tyers and Anderson 1993 or Swinnen 1993). The common logic of these approaches is that national politicians maximize their political support redistributing income from the non-agricultural to the agricultural voter segment. Denoting the income gain to the farmers by  $\Pi^n$  and the income loss of the general public by  $B^n$ , the political support function  $S^n(\alpha_n)$  can be represented by the weighted sum of the net income received by the different voter segments:

$$(14) \quad S^n(\mathbf{a}_n) = g_f \Pi^n(\mathbf{a}_n) - (1 - g_f) B^n(\mathbf{a}_n)$$

$0 < g_f < 1$  denotes the political weight of the farmers. The more favorable the economic transfer of income from the non-agricultural to the agricultural voter segment and the higher the political weight  $g_f$  of the agricultural voter segment, the higher is c.p. the agricultural protection level  $\alpha_n$  in the political equilibrium. The main argument of Tyers and Anderson is that both the political weight as well as the economic transfer of income is more favorable in industrialized when compared to developing countries. What is left out in their analysis is the fact that even at national level there exist multiple politicians with different support functions, e.g. politicians from urban and rural constituencies, respectively, who prefer different protection levels. Thus, it remains unclear why and how different political agents preferring different protection levels will commonly agree on a high protection level. As we want to focus on the political decision-making under the CAP, we do not answer this particular question at the national level, but at the supranational level. At the national level we simply assume that the minister of agriculture solely controls the national level of agricultural protection.

At the supranational level we analyze three different decision-making procedures: (1) the so-called Luxembourg compromise, under which agricultural policy has been decided from the beginning of the CAP until 1986 (see Grant 1997), (2) the consulting procedure which has been applied to CAP since 1986 and is the standard procedure and (3) the co-decision procedure which includes the European Parliament into the decision procedure. The co-decision procedure is not applied to agricultural policies yet, but as will be shown below we consider it as an interesting institutional option for the future, especially when the up-coming East enlargement of the EU has taken place.

To analyze the logic of CAP decision-making under the different decision procedures we interpret these procedures as different organizations of political exchange. Hence, the different logic of decision-making under these different decision-making mechanisms corresponds to (a) the configuration of relevant political actors, (b) their political control endowments and (c) policy preferences and (d) the specific exchange mechanism. Overall, these different settings translate into different political exchange equilibria and hence into different agricultural policy outcome.

Regarding the organization of political exchange we first have to identify the subset of relevant political actors, i.e. actors holding political control resources of the CAP. Given the subset of relevant actors we have to analyze how political exchange among these actors is organized. According to the constitutional rules of the consultation procedure, only the national members of the council and the commission are involved in agricultural decision-making, while the EP has no formal decision power (§43 of the treaty). Empirically, national agricultural ministers and the general directory of agriculture (GD VI) are the relevant political actors of the CAP (Grant 1997). This is noteworthy, since according to the treaty it is generally possible that CAP could be decided by the national finance ministers and all 20 commissioners. According to our theoretical analyses we interpret observed decision practices as a specific form of political macro-exchange. In analogy to national governmental policy-making we call this specific form of macro-control exchange "principle of ministry government" as the corresponding resort ministers control solely their policy domain. So far, we have only analyzed which actors are relevant, e.g. do hold political control endowments. Next we have to quantify the control



endowment of the relevant political actors and we have to specify how these control endowments are exchanged to reach a final decision.

Given the theoretical expositions in the last section political control endowments of individual actors correspond to their voting power indices derived for the consultation procedure. Further, for the consultation procedure it is assumed that among the relevant political actors, a political equilibrium is reached via centralized political exchange, where the Commission, i.e. the GD VI, functions as a Walras auctioneer trying to find a political exchange equilibrium.

Decision-making under the Luxembourg compromise is significantly different when compared to the consultation procedure. In essence, the Luxembourg compromise can be understood as the formation of a universal coalition (see Weingast 1979) formed among the national ministers of agriculture who decided unanimously in the council. Therefore, the commission was/is de facto excluded from the decision-making process. Further, within this universal coalition the final agricultural policy decision is reached via political control exchange. In particular, we interpret CAP-decision-making under the Luxembourg compromise as a specific form of political exchange, where in equilibrium each national agricultural minister solely controls his national level of agricultural protection<sup>5</sup>.

Finally, under the co-decision procedure the EP would be additionally involved, i.e. hold political control resources over the CAP. Generally we assume that within the council and the commission the principle of ministry government applies as well, that is political control endowment of these institutions is solely held by the ministers of agriculture and the GD VI, respectively. An important question is then, who are the relevant political actors within the EP. In the literature the parliamentary groups are often considered as relevant political actors of the EP. In contrast, some authors consider the national parties as relevant political actors within the EP (for example Colomer/Hosli 1997). The latter interpretation is justified by the fact that according

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<sup>5</sup>There can be found various empirical support for our interpretation. For example, there exist a lot of curious examples proving that single national ministries forced the council to implement support schemes under the CAP for agricultural products specifically produced in their countries, e.g. the market regulation for Scottish whisky. Moreover, note that although most market regimes applied to all national member states, specific national support levels could be reached due to national production patterns as well as due to the specific agrimonetary system (see Grant 1997).

to European election law national voters can only vote for their own national parties. As will be discussed in more detail below the assumption if supranational parliamentary groups or national parties are the relevant actors of the EP will have particular importance for the expected policy outcome of the CAP formulated under the co-decision procedure. Given the relevant political actors, we assume for the co-decision procedure that CAP decisions result from centralized political exchange, where political control endowments of individual actors are derived from their voting power indices corresponding with the co-decision procedure and again, the Commission, i.e. the GD VI, functions as a Walras auctioneer trying to find a political exchange equilibrium.

To relate different organizations of political exchange systematically with political outcomes, we have to derive the corresponding political exchange equilibria. Therefore, we need to consider the policy preferences of the involved political actors. According to eq. (15) individual policy preferences can be derived from the maximization of actors' political support.

Regarding preferred national protection levels of national Ministries of Agriculture (MoA's) the principle of financial solidarity plays an important role. Obviously, given the principle of financial solidarity, MoA's do not have to consider the total, but only a part of the total costs determined by their national budget share  $\beta_i$  (see Koester 1996)<sup>6</sup>.

Introducing national budget shares into eq. (14) actors' preferred national protection levels vary systematically according to the relevant budget share and the political weight of farmers. Hence, we can systematically distinguish four types of actors: (1) Political actors with a high political weight for farmers and a low budget share. In this category fall the national ministers preferring a high level of protection for their own national agricultural sector and a low level of protection for all other national agricultural sectors. Note, that due to the financial solidarity preferred own national protection levels of MoA's are higher under the CAP in comparison to a national policy formulation. (2) Actors with a high political weight for farmers, but a high

budget share. In this category falls the GD VI who, as a supranational actor, considers total costs of national agricultural protection. On the other hand there is high empirical evidence that the GD VI is in the same degree related to farmers' lobby as the national ministries. Hence, overall it follows c.p. that the GD VI prefers the same national protection levels as MoA's would do given a national budget share of one ( $t_n=1$ ). (3) Actors with a low political weight of farmers and a high budget share. The parliamentary groups lie in this category. As supranational actors they consider total cost of national protection. Further, unlike the GD VI, parliamentary groups depend less on farmers' support. Hence, overall for the parliamentary groups the lowest preferred national protection levels are derived. (4) Actors observing a low political weight of farmers and a low budget share. We consider national parties of the EP to fall in this category. Analogously to MoA's, national parties take only their national cost share into account. Therefore, national parties like MoA's prefer c.p. a high protection level of their own and a low protection level of other agricultural sectors, respectively. But, in contrast to MoA's national parties are mainly supported by non-farm population and thus put a lower political weight on the support of farmers. Overall, in comparison to MoA's, national parties will prefer a lower protection level of their own agricultural sector

Given the organization of political exchange and given the systematic policy preferences of the relevant political actors the following qualitative conclusions regarding the CAP policy outcome under the different decision mechanism can be drawn.

1. Agricultural protection and hence economic costs to the general public will be the highest for the Luxembourg compromise. In particular, national protection levels will be significantly higher under the CAP formulated under the Luxembourg compromise when compared to national policy formulation. As outlined above, this follows directly as the consequence of the principal of financial solidarity and the specific organization of political exchange. In

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<sup>6</sup> Beside budget cost, costs of agricultural protection might also include other costs, e.g. welfare losses of consumers. For simplicity, we simply assume that national shares in these costs correspond to the budget share.

essence, this parallels agricultural policy formulation in the EU-system and pork barrel politics in the US-system discussed by Weingast et al. (1981).

2. In comparison to the Luxembourg compromise, protection levels are lower for the consultation procedure due to the following two reasons. First, the GD VI preferring lower protection levels has some political control in equilibrium. Second, in contrast to the Luxembourg compromise qualified majority voting is applied within the council and therefore, at least some MoA's hold political control resources over agricultural protection levels in other countries in exchange equilibrium.
3. By the same logic national protection levels will be lower under the co-decision procedure when compared to the Luxembourg compromise. Additionally, beside the GD VI the relevant actors of the EP hold political control in equilibrium.
4. Due to the external effects of political exchange it is not possible to conclude if national protection levels will be lower under the co-decision or the consultation procedure without computing the corresponding exchange equilibria. Analogously, it is not possible to analyze if protection levels under the consultation or co-decision procedure are lower in comparison to a national policy formulation. To be able to do this kind of analysis the concrete equilibria will be calculated in the next chapter.

#### **4 Economic efficiency of institutional options of the CAP**

In this section we will simulate political exchange equilibria under the three different decision-making mechanisms. As the calculation of exchange equilibria of an abstract economy including external effects is rather complex, we reduce the EU-12<sup>7</sup> to 6 members M1 to M6 by pairing countries together<sup>8</sup>. The economic size and hence also the size of the agricultural sector of the member states increases from M1 to M6.

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<sup>7</sup> We consider the EU-12 and not the EU-15, since most of the empirical data analysis supporting the simulation undertaken in this section have been collected for the EU-12. Again the general conclusions taken from the simulation analysis will not significantly change when analyzing the EU-15.

<sup>8</sup> In detail, we pair Belgium and Luxembourg, Greece and Ireland, Netherlands and Denmark, Spain and Portugal, France and Italy as well as Germany and United Kingdom to the members M1 to M6.

Further, we take the GD VI as an additional political actor labeled "com". To be able to analyze political exchange equilibrium under the co-decision procedure as well, we interpret the same pairs defined for the council as relevant national actors within the EP denoted EP1 to EP6 in tables 1-2.

Regarding actors' policy preferences we assume the following functional form for the utility function  $V_i(c)$ <sup>9</sup>:

$$(15) \quad V_i(c) = \prod_j (1 - m_j + m_j C_{ij})^{\theta_{ij}}, \quad \text{with: } m_j = \sum_{k=ii} \frac{C_{kj}}{\sum_{h \neq i} C_{hj}} |X_{kj} - X_{ij}|$$

$X_{ij}$  denotes the preferred level of agricultural protection and  $\theta_{ij}$  denotes the relative interest of an actor  $i$  in the protection level of state  $j$ .

The relevant input and output data of the simulated political exchange model are presented in tables 1 and 2. Political control endowment of the relevant actors ( $C^a$ ) corresponds with the sum of Banzhaf indices of the paired member states calculated for analyzed decision-making procedures (see tables 1 and 2). According to the exposition made above we generally assume that national MoA's in the council have the highest preferred agricultural protection level for their own country, which we generally set  $X_{nn} = 1$  and the lowest for the protection level for other countries, which we set to 0. Further, since preferred levels of own agricultural protection would be significantly lower, if protection was financed nationally, we assume a level of 0.2.<sup>10</sup> According to our theoretical consideration above we assume that 0.2 is also the agricultural protection level generally preferred by the GD VI for all national member states, e.g.  $\alpha_{\text{comn}}=0.2$  for all  $n=M1, \dots, M6$ , while the national parties in the EP prefer a slightly higher protection level for their own countries given values of  $X_{EPnn} = 0.5$ . Obviously, like the MoA's in the council, national parties prefer a zero agricultural protection level as far as other countries are concerned.

Finally, we assume that all national politicians, i.e. M1 to M6 and EP1 to EP6, have a relatively high interest in national protection given an interest parameter of  $\theta_{nn} = 0.6$ . The interest in reducing the cost burden of the general public results residually with

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<sup>9</sup>  $V(c)$  corresponds to a specific nested spatial utility function  $U(\alpha)$  (see Henning 2000).

a value of 0.4. This interest is revealed via demand of political control over agricultural protection levels of other member states. Here, we assume that due to the different sizes of the agricultural sectors relative interests in controlling the agricultural protection levels of the other member states increases proportionally from the smallest (M1) to the largest member state (M6). Analogously, the relative interest of the GD VI in controlling national protection levels increases proportionally with the size of the member state.

### *Results*

In political exchange equilibrium of the Luxembourg compromise, national protection levels are totally controlled by national MoA's resulting in protection levels of  $\alpha_n^* = 1$ . Results of the political exchange equilibrium corresponding with the two other considered institutional scenarios are presented in table 1-2<sup>11</sup>.

As has been explained above, the consultation and the co-decision procedure results in lower protection levels with an average national protection level of 0.78 and 0.64, respectively. As by construction agricultural protection level under a pure national policy formulation would equal a value of 0.2, simulation analyses imply a significantly higher inefficiency of the CAP in comparison to national policy formulation. At least for the consultation and co-decision procedure this result seems paradox given the relatively high interest of 0.4 political actors have in lowering the costs of agricultural protection and the fact that under these procedures on average more than 70 percent of total political control endowments of national protection levels are held by actors preferring protection levels below or equal to the level reached under national policy formulation. This seeming paradox is explained by external effects of political exchange which imply that in the political exchange equilibrium on average over 75 percent and over 60 percent of total control resources, respectively, are held by the national ministries preferring the highest

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<sup>10</sup> Note, that relative values of preferred protection levels correspond to empirical calculations made on the basis of simple economic general equilibrium models and therefore are empirically justified.

<sup>11</sup> Political exchange equilibrium including external effects has been formulated as a mixed complementary programming problem that could be solved in GAMS using the path-solver. I would

protection level of 1. In particular, high external effects of control demand result for the agricultural ministries given the similarity of ideal positions regarding protection levels of other member states. Due to these external effects, in equilibrium individual demand is too low when compared with individual political interests to limit budget costs. To see this we have in table 1 and 2 additionally presented policy outcomes resulting from political exchange on a perfect market neglecting external effects. Note that neglecting external effects all actors would demand political control resources for any national protection level. Taking external effects into account, MoA's of the smaller countries M1 to M4 completely free-ride under the consultation procedure demanding only control resources of their own national protection level (see table 1). Hence, under this procedure only the GD VI and the MoA's of the two larger countries (M5 and M6) reveal their preferences for a limited cost burden of the general public.

Under the co-decision procedure all MoA's free-ride demanding only control resources of their own protection level, while the national parties in the EP and the GD VI allocate their complete resources to lower the cost burden of agricultural protection (see table 2). Note that for all countries beside the largest M6 it is only the control demand of the national parties in the EP that limits national protection. Again, comparing equilibrium outcome with and without taking external effects into account (see table 2) it follows that observed different control demand for MoA's in the council and national parties in the EP, respectively, occurs in equilibrium although both actor types have the same political interests only due to external effects of political exchange. In specific terms, given the higher protection level preferred for the own country, external effects of the control demand of MoA's imply that national parties in the EP allocate their complete resources to reduce cost of agricultural protection demanding only control resources over agricultural protection levels of other (not the own) countries, thereby reducing overall inefficiency of the CAP.

Overall, simulation results underline our hypothesis that the specific institutional settings of decision-making within the EU-system can explain why agricultural

protection is significantly higher for the CAP when compared to national policy formulation. In detail, we identified the following institutional determinants of the observed economic inefficiency of the CAP: (1) the principle of ministry government, i.e. de facto agricultural policy is formulated by political actors who are strongly related to the farm sector; (2) the financial solidarity, i.e. costs implied by agricultural protection are commonly shared by all national members via fixed cost shares; (3) external effects of political exchange, i.e. although there exists a collective interest in limiting costs of protection, it cannot be fully revealed via political exchange due to external effects.

## **5 Summary and outlook**

In the paper we underlined the hypothesis that the specific institutional settings of decision-making within the EU-system can explain the empirical observation that agricultural protection is significantly higher for the CAP when compared to national policy formulation. In detail, assuming that individual policy preferences are private information we derived a model of centralized political exchange starting from a simplified version of the Baron/Ferejohn model of non-cooperative legislative bargaining. Applying this model to CAP we identified the following institutional determinants of the observed economic inefficiency of the CAP: (1) the principle of ministry government, i.e. de facto agricultural policy is formulated by political actors who are strongly related to the farm sector; (2) the financial solidarity, i.e. costs implied by agricultural protection are commonly shared by all national members via fixed cost shares; (3) external effects of political exchange, i.e. although there exists a collective interest in limiting costs of protection, it cannot be fully revealed via political exchange due to external effects.

Thus, in the paper we have mainly analyzed how given formal and informal institutional rules shape policy outcomes. The question that remains is what determines the choice of different institutional settings. This is a problem of constitutional choice which is beyond the focus of the paper. Nevertheless some short comments should be made. There is a growing literature in positive political theory which de Figueiredo and Weingast call the new "equilibrium institutionalists".



According to this literature, constitutional choices are explained as an equilibrium outcome of individual actors maximizing their individual utility. In this context Weingast (1979) is a first starting point interpreting observed institutional settings as “legislators choosing the rules of the game to maximize their expected benefits”. Following this logic, observed changes from the Luxembourg compromise to the consultation procedure might be explained since the cost of agricultural protection in the EU increases significantly over time due to economic and political reasons. Economically, technical progress in the agricultural sector implies that the net-trade position of the European Union turns for many goods from a net import to a net export position increasing tremendously the budget cost of given protection levels. Politically, the undertaken enlargements of the EU increased the costs of protection as the pork barrel problem increases with the number of member states. This follows directly from eq. (15) as national protection levels preferred by MoA's increase with a lower national cost share (see Weingast et al. 1981). Interestingly, the change from the Luxembourg Compromise to the consultation procedure happened in 1986 (Grant 1997), that is directly the time the second enlargement of the EU from 10 to 12 took place and the third enlargement to the EU-15 was in preparation.

Given the fact that a fourth enlargement of the EU is on its way, the same logic might trigger another institutional reform. Given the simulation results above, the implementation of the co-decision procedure might be one option. But, since external effects of political exchange increase with the number of relevant political actors, this option might not be sufficient. An alternative institutional option is to abolish the principle of financial solidarity, which is actually discussed in terms of renationalization, which means that each member state pay their own budgetary costs related with the CAP. Renationalization seems a promising option to avoid a further increase of the inefficiency of agricultural policy especially after the East enlargement has taken place (Grant 1997). On the other hand renationalization also neglects welfare transfers via agricultural policy from the highly industrialized to the less industrialized member states, which might be part of a higher order deal among these countries. Hence, beside economic efficiency of CAP there exist many other factors determining the political preferences of relevant political actors. In particular, note that also increased inefficiency of the CAP can explain observed institutional

changes from the Luxembourg compromise to the consultation procedure, but it completely fails to explain the implementation and maintenance of the principle of financial solidarity or the principle of ministry government in the CAP. Therefore, it is not that simple to model constitutional choices within the European integration process. In general, the question is who are the relevant actors choosing the rules of the game, which determines their preferences, and what are the rules determining the constitutional choice game? Regarding the problem of the CAP, it is questionable (1) if relevant political actors of the constitutional choice game can be limited to the relevant political actors of CAP. (2) Beside policy outputs that translate implicitly into politicians' utility via political support, there are transaction costs of the political decision-making process itself that determine constitutional choices. Note in this regard that the principle of government or the Luxembourg Compromise promoting inefficiency of policy outcome might be justified by gains from the division of labor. (3) Beyond efficiency of policy outputs and the decision-making process, there might be other factors influencing the utility of political actors. For example, Vaubel (1995) focuses on individual benefits of politicians like power and prestige, that beyond efficiency make national and supranational politicians prefer centralized decision-making procedures. In essence, Vaubel hypothesized that centralization of the EU might be mainly determined by a process of encroachment by the supranational center. In this framework de Figueiredo and Weingast (1998) present an interesting model of self-enforcing federalism discussing conditions under which federalism is a stable equilibrium save against encroachment by the center and free rider of the constituent units which can be applied to the constitutional choice problem of the European Union as well.

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*Proof of Proposition 1:*

(i) According to the structure of the game a recognized legislator chooses a proposal  $\alpha \in R^m$  maximizing his expected payoff:

$$EU_i = P_i(\mathbf{a})U_i(\mathbf{a}) + (1 - P_i(\mathbf{a}))v_i$$

$$\text{with: } P_i(\mathbf{a}) = \sum_{i \in G} \prod_{j \in G} \int_0^1 P_{ij}(\mathbf{a}) dP_{ij} \prod_{k \notin G} \left( 1 - \int_0^1 P_{ik}(\mathbf{a}) dP_{ik} \right)$$

As it holds for  $\alpha \notin H(s)$  that  $P_{ij}(\alpha) = 0$  and for any  $\alpha, \alpha' \in H(s)$  it holds:

$$\int_0^1 P_{ij}(\mathbf{a}) dP_{ij} = 0.5$$

it follows:  $P_i(\mathbf{a}) = P_i(\mathbf{a}') = \sum_{i \in G} 0.5^n = 0.5^n g_i \quad \forall \mathbf{a} \in H(s)$

where  $g_i \in \mathbb{N}$  denotes the number of winning coalitions, in which legislator  $i$  is a member. Hence, it follows directly that in every subgame each recognized legislator  $i$  will propose the maximand of his utility function over  $H(s)$ , that is  $x_i$ . To establish necessity, notice that all subgames are identical. Let  $v_i$  denote the stationary continuation value for a legislator  $i = 1, \dots, n$  for each subgame. Then it follows for the continuation values:

$$v_i = \frac{1}{n} \sum_k P_k U_i(x_k) + v_i p_T \frac{1}{n} \sum_k (1 - P_k) + (1 - p_T) \frac{1}{n} \sum_k (1 - P_k) U_i(s)$$

$$\Leftrightarrow$$

$$v_i = \frac{\frac{1}{n} \sum_k P_k}{1 - p_T + p_T \frac{1}{n} \sum_k P_k} \sum_k \frac{P_k}{\sum_k P_k} U_i(x_k) + \frac{(1 - p_T) \left( 1 - \frac{1}{n} \sum_k P_k \right)}{1 - p_T + p_T \frac{1}{n} \sum_k P_k} U_i(s)$$

(ii) The ex ante probability  $Q_s$  that the status quo will be the outcome of the legislative game is given by the following equation:

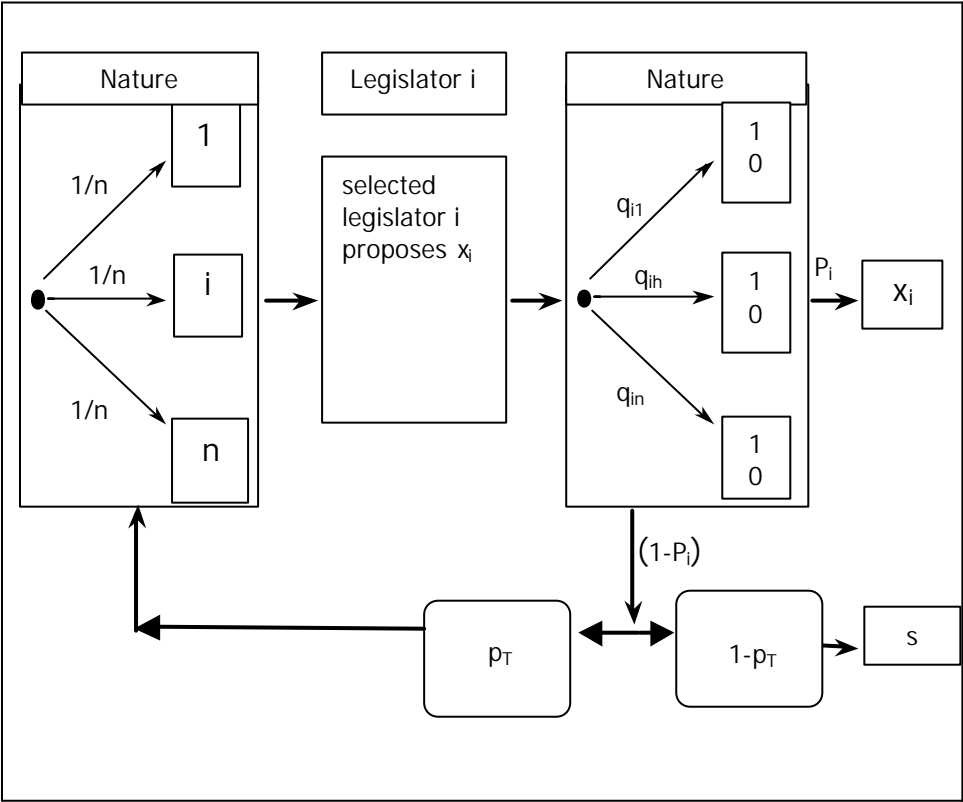
$$Q_s = (1 - p_T) \frac{1}{n} \sum_k (1 - P_k) \sum_{t=0}^{\infty} \left[ \frac{1}{n} \sum_k (1 - P_k) p_T \right]^t = \frac{(1 - p_T) \left( 1 - \frac{1}{n} \sum_k P_k \right)}{1 - p_T + p_T \frac{1}{n} \sum_k P_k}$$

(iii) Accordingly, the ex ante probability that the proposal  $x_i$  will be the outcome of the legislative game is given by the following equation:

$$Q_i = \frac{1}{n} P_k \sum_{t=0}^{\infty} \left[ \frac{1}{n} \sum_k (1 - P_k) p_T \right]^t = (1 - Q_s) \frac{P_i}{\sum_k P_k} = (1 - Q_s) \frac{g_i}{\sum_k g_k} = (1 - Q_s) C_i$$

(iv) Finally, it follows directly from (i) and (iii) that it holds for the values of the game:  $v_i = (1 - Q_s) \sum_k C_k U_i(x_k) + Q_s U_i(s)$ . Q.E.D.

Figure 1: Game-Tree of the non-cooperative bargaining game



**Table 1: Political control demand in exchange equilibrium:  
Consultation Procedure**

	Policy Issues *						C <sup>a</sup>
	I1	I2	I3	I4	I5	I6	
Agents	<i>Political control demand (C<sub>ij</sub><sup>*</sup>)</i>						
M1	0.704						0.072106
M2		0.78					0.095635
M3			0.753				0.095635
M4				0.8			0.148766
M5	0.296	0.124			0.777		0.217836
M6		0.097	0.247			0.727	0.217836
Sum council	1	1	1	0.8	0.777	0.727	0.847818
Com				0.2	0.223	0.273	0.152182
EP1							
EP2							
EP3							
EP4							
EP5							
EP6							
Sum EP	0	0	0	0	0	0	0
Total sum	1	1	1	1	1	1	1
Prices	2.33	2.789	2.886	4.23	5.039	5.463	
Decision	0.704	0.78	0.753	0.84	0.822	0.782	
Decision assuming							
Perfect market	0.40	0.46	0.44	0.55	0.63	0.62	
No exchange	0.10	0.13	0.13	0.18	0.25	0.25	

Source: own calculations

\* I<sub>i</sub> = National protection level of member state i

**Table 2: Political control demand in the exchange equilibrium:  
Co-decision Procedure**

	Policy Issues *						C <sup>a</sup>
	I1	I2	I3	I4	I5	I6	
Agents	<i>Political control demand (C<sub>ij</sub><sup>*</sup>)</i>						
M1	0.51						0.05373
M2		0.626					0.07126
M3			0.621				0.07126
M4				0.63			0.11085
M5					0.756		0.16232
M6						0.589	0.16232
Sum council							
Com						0.411	0.1134
EP1		0.01	0.042		0.029		0.01202
EP2					0.073		0.01558
EP3					0.082		0.01758
EP4		0.364					0.0414
EP5	0.49		0.264				0.08191
EP6			0.073	0.37	0.061		0.08636
Sum EP	0.33	0.39	0.38	0.48	0.57	0.56	0.45
Total sum	1	1	1	1	1	1	1
Prices	1.65	1.78	1.80	2.76	3.36	4.32	
Decision	0.51	0.63	0.62	0.63	0.76	0.67	
Decision assuming Perfect market No exchange	0.08	0.10	0.10	0.15	0.23	0.23	

Source: own calculations

\* I<sub>i</sub> = National protection level of member state i